Sept. 5, 1967 W. M. RIGGLES, JR 3,339,860

ROTATING CONTROL DEVICE

Filed Sept. 27, 1965

FIG. 3

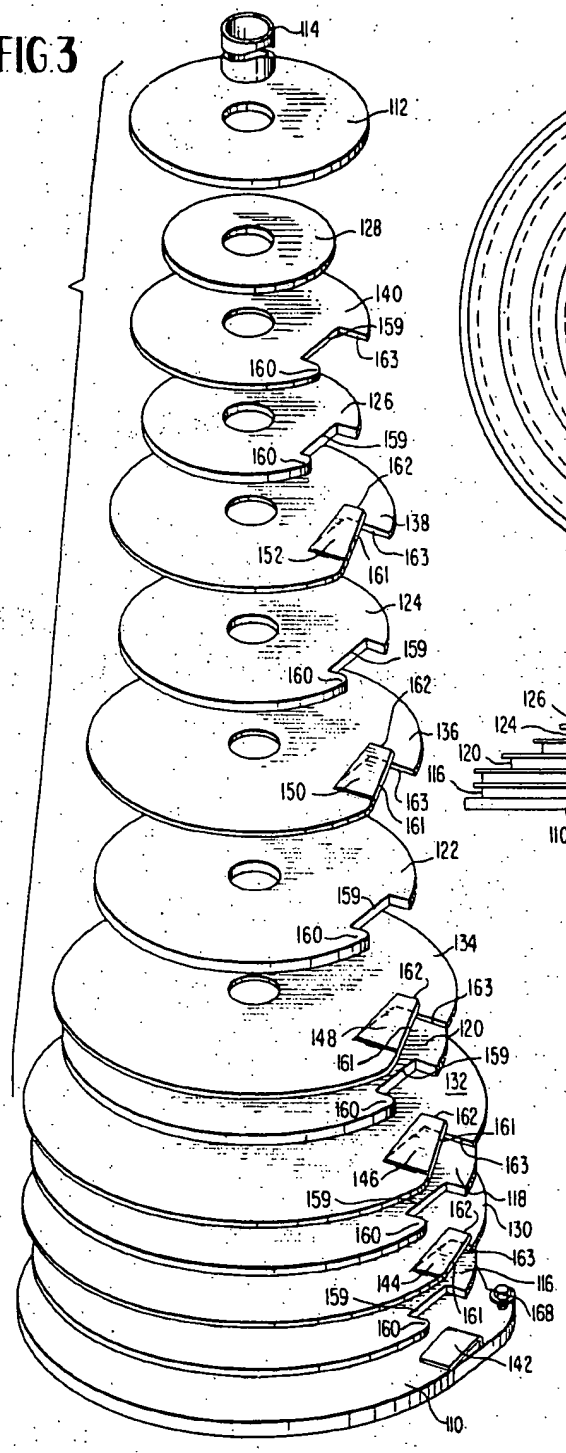
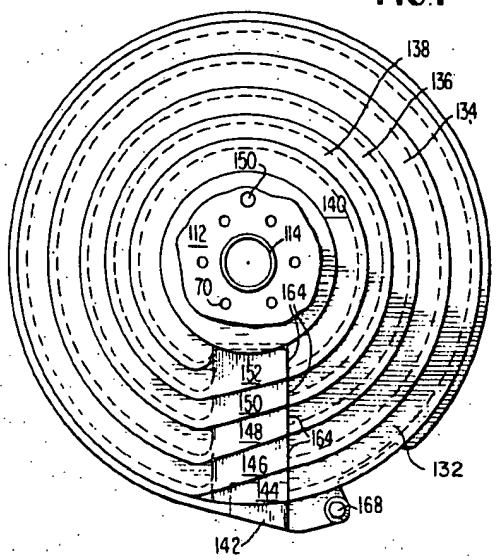


FIG. 1



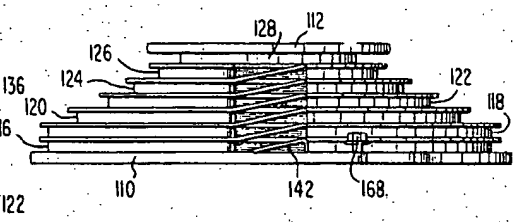


FIG. 2

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ROTATING CONTROL DEVICE

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5 Claims. (Cl. 242—117)

ABSTRACT OF THE DISCLOSURE

A rotating device made up of superposed plates presenting spiral-like paths for control purposes.

This invention relates to rotating devices presenting spiral-like peripheral paths for control purposes. More specifically, the invention relates to a spiral pulley for reeling cable in a controlled manner.

It is desirable at times in the case of cams and reels to form a spiral path or a path which approaches a true spiral and the present invention involves the design of such a device in an economic manner where absolute conformity with a true spiral path is not essential. One environment in which such a device finds utility is in the curtain portion reeling and unreeling system for conveyance loaders of the type disclosed in copending application Ser. No. 486,659, filed Sept. 13, 1965, by Andrew G. Seipos.

The primary desideratum of the present invention is the provision of a mechanically strong device which can be economically manufactured.

A full understanding of the present invention will be apparent from the following detailed description of the preferred embodiment, taken in conjunction with the accompanying drawing illustrating the same wherein:

FIGURE 1 is a plan view of a device incorporating the present invention;

FIGURE 2 is a side elevational view of the device of FIGURE 1; and

FIGURE 3 is an exploded view of the device of FIGURES 1 and 2.

Referring to the drawings, a base plate **110** and a cover plate **112** have extending between them and in the assembled device welded to each of them a shaft receiving bushing **114**. Sandwiched in between base plate **110** and cover plate **112** and concentrically supported on bushing **114** are a series of relatively smaller diameter heavy metal plates and larger diameter light metal plates of generally circular configuration. The heavy plates are numbered from the bottom in FIGURES 1 to 3, inclusive, **116, 118, 120, 122, 124, 126** and **128**. The light plates are numbered consecutively from the bottom in these figures, **130, 132, 134, 136, 138** and **140**. As best shown in the exploded view of FIGURE 3, base plate **110** has a ramp member **142** welded to it and each of light plate numbers **130, 132, 134, 136** and **138** has a cut-out and bent-up tongue **144, 146, 148, 150** and **152**, respectively, which act as ramps in the assembled spiral pulley. It will be apparent that in the assembled spiral pulley the cable will ride on the peripheral surfaces of the heavy plates with the outwardly extending marginal portions of the light plates acting as guiding flanges to constrain the cable winding action to the circular peripheral surfaces of each heavy plate until the cable comes to a ramp member. Since each ramp member guides the cable to the next smaller diameter heavy plate, a notch **159** must be formed in each of the heavy plates **116, 118, 120, 122, 124, 126** and in light plate **140** to achieve a smooth transition of the cable to the next smaller heavy diameter plate. At the points where the cable passes from each heavy plate to the next by virtue of a ramp, the leading corner of notch

159 of each heavy plate is rounded as at **160** to minimize the bending action of the cable at this point. The external edge **161** of each tongue is slanted inwardly so that the uppermost edge **162** of each tongue member fits and is welded at **164** to the cut edge **163** of the next higher light plate. Although not so shown in the drawing for simplicity, edges **161** are rounded since the cable rides up these edges. In like manner all sharp edges on ramp member **142** are smoothed by grinding or made flush by filling with welding metal.

A dowel pin **150** passes through cover plate **112**, base plate **110** and all of the intermediate plates to insure rigidity of the completed structure. For purposes of simplicity the openings for dowel pin **150** and bolt holes **70** are omitted from exploded FIGURE 3.

In operation of the preferred embodiment as a spiral pulley, a cable end can be anchored on anchor **168** of base plate **110** and then passed in counterclockwise direction around the pulley, resting on the peripheral edge surface of plate **116**. Clockwise rotation of the pulley will result in ramp member **142** transferring the cable from plate **116** to the peripheral surface portion of plate **118** and with continued clockwise rotation of the device the inclined surfaces **161** of succeeeding tongues **144, 146, 148, 150** and **152** will guide the cable onto the peripheral edge surfaces of the progressively smaller plates **120, 122, 124, 126, 128**.

It will be apparent that in following the foregoing path the cable will not be following a true spiral path but rather a series of circular paths of decreasing diameter with a sudden diversion due to the ramp members in between the circular paths. Nevertheless for some uses, for example the environment of copending patent application Ser. No. 486,659, the ruggedness of construction of the preferred embodiment of the present invention and cheapness of manufacture justifies departure from the ideal spiral path where means are provided for compensating for departure from the ideal.

Incidentally, it will be noted that the largest heavy plates **116** and **118** are of the same diameter to permit use of only a fraction of the heavy plate **116** where desirable for adjustment purposes and of course this expedient is equally applicable to the small end of the pulley.

Having illustrated and described a preferred embodiment, I claim as my invention:

1. A rotatable device for guiding a control element in a substantially spiral path around a peripheral surface of the device comprising:

(a) a plurality of first flat plates of circular outline arranged concentric to and in spaced relationship along the axis of rotation of the device, the plates being of varying diameters with the largest diameter first plate followed along the length of the axis of rotation by succeeding first plates with each succeeding first plate having a smaller diameter than the preceding plate,

(b) a plurality of second flat plates, a second flat plate being interposed between each pair of adjacent first plates, the second plate in each case having a marginal, circumferential edge portion extending beyond the periphery of the larger of the two contiguous first plates,

(c) means forming a notch in the marginal portion of the periphery of each first plate other than the smallest diameter first plate,

(d) means forming a notch in the marginal portion of the periphery of the smallest diameter second plate, and

(e) an inclined surface means extending from the marginal circumferential edge portion of each second plate other than the smallest diameter second plate

across the notch in a first plate which is contiguous to such second plate, such inclined surface means extending to the adjacent second plate which is contiguous to the next smaller diameter first plate.

2. A device of the character described in claim 1 in which the means of limitation (e) comprises a tongue cut from the marginal portion of the periphery of each second plate other than the smallest diameter second plate and bent to form the inclined surface means, each such tongue registering with and extending across the notch in a first plate which is contiguous to such second plate, the free end of the tongue being connected to the adjacent second plate which is contiguous to the next smaller diameter first plate.

3. A device of the character described in claim 1 in which the means of limitation (c) comprises a notch which extends inwardly in the margin of each such first plate to a point spaced from the axis of rotation a distance substantially equal to the radius of the next smaller diameter first plate.

4. A device as claimed in claim 1 comprising a base plate external to the largest diameter first plate having a marginal, circumferential edge portion extending beyond the periphery of the largest diameter first plate, and a cover plate external to the smallest diameter first plate having a marginal, circumferential edge portion extending beyond the periphery of the smallest diameter first plate, and means holding all the plates in contiguity and againts relative rotation.

5. A device of the character described in claim 1 in which the notches in all first plates other than the smallest diameter first plate coincide circumferentially.

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